Ecofocus

SPRING 2025

CARY INSTITUTE OF ECOSYSTEM STUDIES

Maribeth Rubenstein

NEXT-GENERATION MONITORING ON THE HUDSON

Cary Institute has a long history of Hudson River science, from restoring shorelines to tracking invasive species and monitoring the food web. We are excited to be part of a new effort, in partnership with the Hudson River Foundation, to track the river's health and ensure it continues to be managed with the best possible science, supporting biodiversity, clean drinking water, sustainable fisheries, and recreational use.

In February, Cary researchers kicked off the Interim Lower Food Web Survey, a three-year program to keep tabs on the tiny plants and animals at the base of the Hudson's food web. Led by Cary aquatic ecologist Chris Solomon, the work is supported by a $1.7 million grant from the Hudson River Foundation. It builds on several historical data sets — including those from more than 30 years of Hudson River monitoring by Cary Institute scientists — while helping to envision a next-generation monitoring plan.

"We're excited to be working with our partners in the Hudson research and management community to help sustain the history and reimagine the future of ecosystem monitoring in this iconic river estuary," said Solomon.

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Bulletin Board: Announcements and Events

FROM OUR PRESIDENT

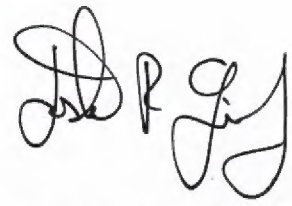
Dear Friends,

It's a scary time to be a scientist. Over the past few months, we have seen an unprecedented unraveling of federal support for science. We are witnessing the diminishment and dismantling of agencies that have been vital partners in advancing ecological and environmental science, including the National Science Foundation (NSF), the Environmental Protection Agency (EPA), the US Forest Service (USFS), the National Oceanic and Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA).

This attack on science is playing out in many ways. Long-time federal collaborators have been fired, rehired, and retired. Hard-earned grants, essential to funding research, have been frozen or rescinded. Decades of climate and environmental data are disappearing from federal websites. At the same time, a number of NASA and NOAA monitoring efforts needed to keep a pulse on the planet and inform models are being sunsetted. Many of these cuts compromise research that has taken years or decades to develop.

As I write this note, the administration is planning to cut the budgets of NSF by 56% and EPA by 54%, reductions that would starve the research enterprise well into the future. Despite this, Cary Institute scientists remain optimists, moving forward with their research, pivoting to new funding sources whenever possible, and speaking out about the critical importance of science to human well-being. From work on the ecological dimensions of infectious disease — with an eye toward protecting human health — to ensuring we understand how forests, soils, and freshwaters function so that we can mitigate and adapt to climate change, Cary research is science in support of a better world, for all of us.

In this shifting landscape, private philanthropy is crucial to keeping Cary science strong. Now, more than ever, we need help from individuals who value science and the environment. Thank you for your support.



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Next-Generation Monitoring on the Hudson, Cont. from p.1

The survey stretches from Troy to Lower Manhattan, covering 150 miles of the river. On a monthly basis, the team will collect water quality data as well as information about the biomass and abundance of small plants and animals at the base of the food web, including phytoplankton, zooplankton, bivalves, and other invertebrates.

"This effort builds on the pioneering work of Cary's long-term monitoring of the freshwater Hudson"

"These organisms are critical food for fish like striped bass," said Solomon. "They support the river's fisheries, and they control how the ecosystem works in a lot of really fundamental ways." Understanding trends in these species at the base of the food web will help in anticipating changes in fish abundance, so managers can adjust harvest levels accordingly.

"This effort builds on the pioneering work of Cary's long-term monitoring of the freshwater Hudson," said Jim Lodge, Director of Environmental Programs at the Hudson River Foundation, "and will provide critical new insights and understanding of the Hudson River ecosystem."

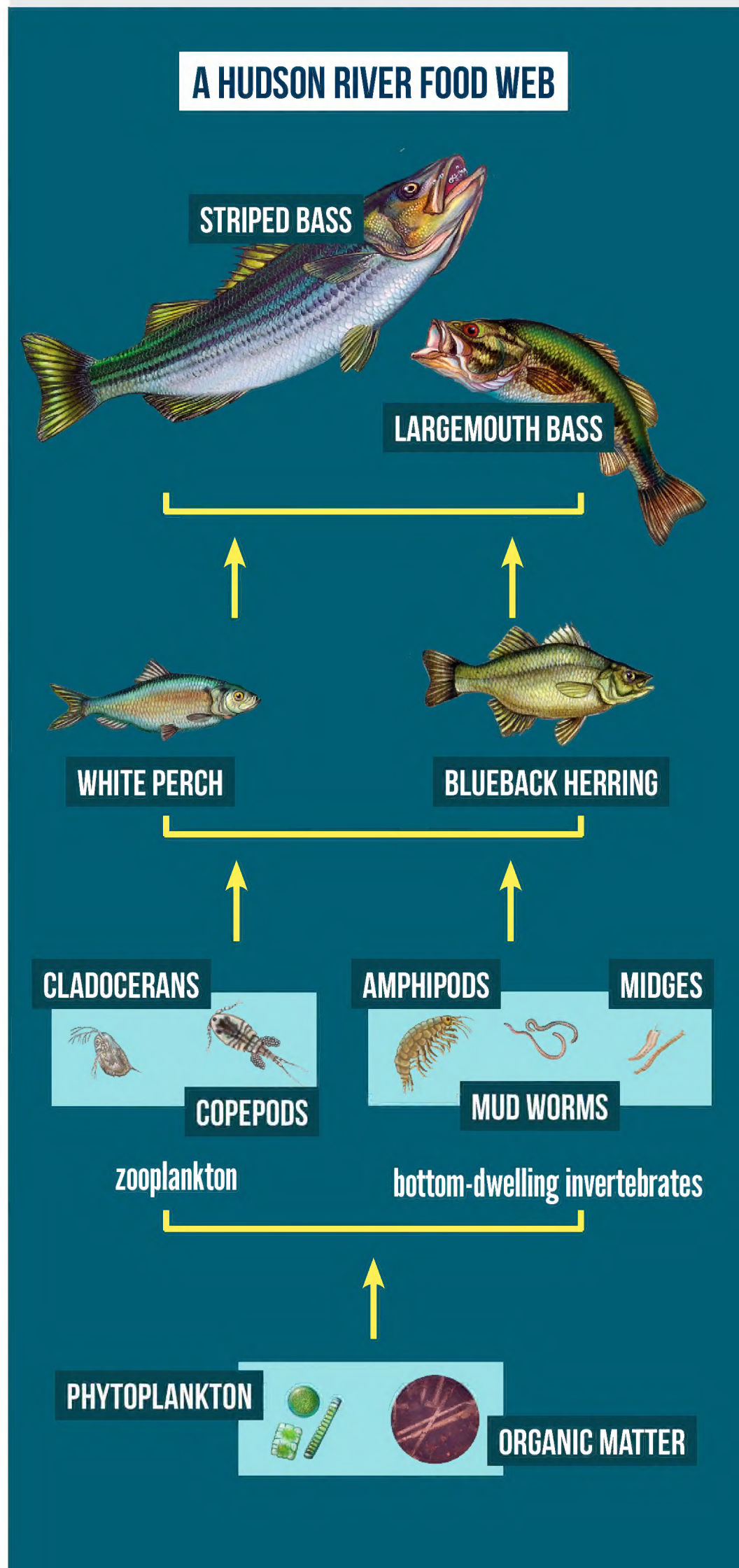
In 1991, Cary's monitoring program detected the arrival of zebra mussels in the Hudson and measured their ecosystem impacts in real time. Similarly, the new survey will provide early warning if other invasive species appear, and will help to reveal how changes in temperature, precipitation, and sea level due to climate change will alter Hudson ecosystems and water quality. These changes are important for communities who rely on the river for drinking water and recreation.

"The Hudson River estuary is a vital resource for New York, and one that's really intertwined with our culture and way of life," said Solomon. "I think it's important for us to take care of it and keep a finger on its pulse. This survey will help us do that."

You can be a part of making Cary's research possible.

CARYINSTITUTE.ORG/DONATE

Chris Solomon, David Fischer, and Heather Malcolm (L to R) sampling on the Hudson River.



Sarah Trecht

KEEPING TABS ON TICKS IN THE HUDSON VALLEY

The arrival of spring signals the start of a new field work season on Cary's 2,000-acre research campus. As they have for more than 30 years, Cary researchers return to the forest to collect ticks, trap small mammals, and measure other environmental factors. The effort is revealing how ecological conditions shape blacklegged tick populations, and helps predict the risk of tick-borne diseases such as Lyme, babesiosis, and anaplasmosis.

This year, disease ecologists Richard Ostfeld and Shannon LaDeau are expanding the project in two intriguing new directions.

With funding from the National Science Foundation, the first new line of inquiry is tracking how the 2024 spongy moth outbreak affected tick populations. Spongy moth caterpillars stripped many trees of their leaves, creating brighter, hotter, and drier conditions on the ground that could kill off younger ticks.

CARY WELCOMES TWO NEW SCIENTISTS

In 2024, Cary welcomed two new members to its scientific staff.

Tara Stewart Merrill studies how parasites and diseases spread through aquatic habitats and how their effects ripple through ecosystems. She comes to Cary from Florida State University.

Stewart Merrill's work has built immunity into our understanding of wildlife disease with models, experiments, and fieldwork. Working with planktonic crustaceans, she showed that individuals have different levels of immunity to a fungus, and these differences can influence whether fungal outbreaks reach epidemic levels in lakes. She also came up with an easy way to quantify immune resistance in invertebrate vectors, making it possible to include vector susceptibility in predictions of pathogen transmission and risk. Next, she hopes to apply this model to mosquito- and snail-borne diseases that infect people.

Amy Zanne's work is refining our understanding of how carbon moves through ecosystems. Coming from the University of Miami, Zanne examines the fate of carbon stored in dead wood, and how factors such as temperature, moisture, fungi,

Starting last fall and continuing this spring, the team is deploying mesh bags of ticks across areas with no shade, some shade, and lots of shade, simulating a range of high to low defoliation by the caterpillars. Every few weeks, they count how many of the trapped ticks survived. They repeat the process for each tick life stage.

Results may help to refine forecasts of tick-borne disease risk in the coming years. Over the longer term, learning more about what causes variation in tick survival could also lead to new tools for controlling tick-borne disease. “New information can be used to educate the public about taking personal protective measures,” said Ostfeld. “It may also be that the mechanisms that cause tick mortality can be harnessed to help us control tick populations.”

Learning more about what causes variation in tick survival could lead to new tools for controlling tick-borne disease.

For this year’s second new line of inquiry, Ostfeld and LaDeau hope to scale up monitoring of two new species of ticks invading the Hudson Valley: the lone star tick and the longhorned tick. Both have the potential to introduce several new diseases that could infect people, pets, livestock, and wild animals.

Neither invader is common in our region — yet. But rising temperatures and animal movement mean they will likely soon be found in increasing numbers and expanding in range.

While Cary’s current monitoring efforts may pick up an occasional stray lone star or longhorned tick, the new ticks tend to prefer more open and grassy habitats than the forested sites in the long-term study. With a modest amount of additional funding, the team could expand to new sites that would help to reveal the new ticks’ abundance, distribution, where they’re moving to, and how rapidly they're spreading from one year to the next.

By catching the invasion early, Ostfeld and LaDeau hope to reduce risk to people and make sure that the agriculture industry, pet care providers, and the healthcare community have the information they need to take precautions.

With its decades-long legacy of tick research, Cary Institute is uniquely positioned to detect these new invaders and measure their impacts.

“Identifying these important disruptions from the spongy moth outbreak or potentially, a new tick species, was only possible because we had an ongoing, long-term study,” said LaDeau. “The 30 years of consistent tick, host, and pathogen data at Cary Institute are a unique and powerful example of fundamental research that allows for new questions to arise, and we are poised to develop real answers.”

termites, and differences in plant construction influence carbon emissions from decomposition.

She is also beginning investigations of carbon fluxes at the boundaries where different environments meet. For example, at seasonal wetlands in Brazil that connect dry grasslands with ever-wet peatlands, she expects to find shifts in carbon storage and emissions with intermittent flooding.

Zanne’s precise carbon accounting is essential for understanding relationships between ecosystems and climate, as we strive for more accurate projections of climate change. She will discuss this research and more during a public lecture on **Friday, October 17**. Save the date!

Tara Stewart Merrill

Amy Zanne

BULLETIN BOARD

Announcements and events

Scientist News

Welcoming Taylor to the Cary team

An aquatic biogeochemist, Taylor Maavara is the latest scientist to join our team. She studies human impacts on river networks worldwide.

Congratulations

Winslow Hansen &
Tara Stewart Merrill

Winslow and Tara have been elected as two of only ten Early Career Fellows of the Ecological Society of America for their demonstrated excellence and potential for future contributions to science.

Intern Spotlight

Corinne Pita
Education Intern

This experience has allowed me to hone my skills in education and environmental communication, getting real-world experience teaching kids and adults all about the wonders of ecology!

Corinne is an intern in Cary's Education Program, where she helps support the Hudson Data Jam Competition, school field trips, and outreach to local communities.

Beyond the Sea: The Hidden Life in Lakes, Streams, and Wetlands
Fri June 13 @7pm
A foray into Earth's inland waters and the remarkable species they contain.

caryinstitute.org/events

Living Sustainably with Wildfire: Science for Solutions
Panelists discuss lessons learned from the LA fires and risks to water resources and forest health.

caryinstitute.org/lecture-videos

Gigante: Tracking the Fate of the World's Big Trees
Take a trip to the tropics to explore when, where, and why giant tropical trees die.

caryinstitute.org/lecture-videos

Ecofocus is published by Cary Institute of Ecosystem Studies, an independent nonprofit center for environmental research. Since 1983, our scientists have been investigating the complex interactions that govern the natural world and the impacts of climate change on these systems. Our findings lead to more effective management and policy actions and increased environmental literacy. Staff are global experts in the ecology of: cities, disease, forests, and freshwater.

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OUR THANKS

Remembering **two shining stars** of the Aldo Leopold Society

The Aldo Leopold Society provides vital annual support for Cary Institute, helping to fund science that underpins the well-being of people and the planet. Sadly, two of our loyal members died last year — David Greenwood (Millbrook), and Elizabeth Theiler Martin (Dobbs Ferry).

David Greenwood and his wife, Nan, have been pillars of the Aldo Leopold Society for three decades. David, an educator for over 44 years, was a staunch believer in supporting local organizations and helped to "cross-pollinate" between worthy causes. David introduced many new friends to the Institute, attended countless lectures and walks, and greeted our guests when the renovated Tozer Ecosystem Science Building reopened to the public. Everywhere we go, we see the lasting impacts he has made on our lives and communities.

Elizabeth Theiler Martin and her partner, Stephen Tilly, have been members of the Aldo Leopold Society since 1993. Their support has helped Cary Institute become a global leader in ecosystem science — an impact that aligns with the mission of their architecture studio, which addresses climate change through energy-efficient design, adaptive reuse, and a deep commitment to sustainability. Elizabeth, a landscape designer and former dancer, had a clear passion for our science, and once said our work is "critical to life on our planet."

We are extremely fortunate to have been able to count David and Elizabeth amongst our close circle of friends. They will long be remembered for their extraordinary commitment to Cary Institute, and the many ways they have made the world a better place for all.

Co-chairs Sarah Buttrick & Hugo Cassirer, Beth Comstock & Chris Travers, Nichola & Peter Gray, Kathryn Heintz, Bindy & Stephen Kaye, Fa & Roger Liddell, and Three Cairns Group brought together an amazing Host Committee and over 130 guests to support Cary's Spring Lunch at The Yale Club of New York City, featuring new scientist Amy Zanne.

Mark your calendar for Fall Lunch on the Bridge on Sunday, September 21, 2025, featuring Barbara Han, a disease ecologist whose research is at the intersection of ecology, computing, and global health.

BECOME A MEMBER OF THE MARY FLAGLER CARY LEGACY SOCIETY

Establish your legacy while sustaining science for the future of our planet.

If you'd like more information or to join the Mary Flagler Cary Legacy Society, contact Nicole Baker at 845-677-7600 x177 or bakern@caryinstitute.org.

Cary Institute
of Ecosystem Studies

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4 STEPS
YOU CAN TAKE TO PROTECT OUR LAKES & RIVERS

Give wildlife space
Stay at least 200 ft away from wildlife, nests, and marked breeding areas.

Keep the shoreline natural
Leave logs and submerged vegetation in place. Keep shoreline vegetation intact.

Observe no-wake zones
Slow to no-wake within 200 ft of the shoreline and wildlife.

Prevent the spread of invasive species
Before leaving the water access, clean, drain, and dry all gear.

POUGHKEEPSIE FIFTH GRADERS STUDY AQUATIC INSECTS AT CARY

Using microscopes, students identified aquatic insects they collected during their field trip.

Cary educators help kids connect to their local ecosystems while practicing hands-on science.

In spring 2024, with generous support from The Blossom Fund of the Community Foundations of the Hudson Valley, Cary educators were able to host field trips for 82 fifth graders from Poughkeepsie's Krieger Elementary School.

During their visits to Cary's research campus, students learned about insects that begin life in the water, such as dragonflies and mayflies. Donning chest waders, the fifth graders netted larvae in Wappinger Creek, where the insects begin their life cycle, then used Cary's microscope lab to identify the creatures they had collected.

> **"Any hands-on science experience that gets children out of the classroom for outdoor education is a benefit to students."**

A hike showed them meadows where the insects live as adults, and taught them about birds, spiders, and other species who forage on them.

"Any hands-on science experience that gets children out of the classroom for outdoor education is a benefit to students," one teacher noted. "Most students sit inside and do not get a chance to explore the world around them."

The field experience was so successful that in spring 2025, all fifth graders in the Poughkeepsie school district will take field trips to Cary.

"Our hope is that the program is improving access to nature, engaging students with science, and empowering them to find ways to help the environment," said Ashley Alred, Cary's education program leader.

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